

Interrelations Between Clinical and Biochemical Parameters in Functional and Aesthetic Prosthetic Treatment of Dysfunctional Syndrome of the Stomatognathic System

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In the cranio-mandibular malrelation, the TMJ can be affected primarily or may occur as a consequence of imbalance, especially at a functional level, with an important biochemical component, of the other components of the stomatognathic system. The patient with its own pathology and therefore individualisation and specificity of the treatment is the first motto of the physician in establishing the treatment plan for TMDs with craniomandibular malrelation and in the same time the importance regarding the interrelations between clinical and biochemical parameters in polytherapy treatment of temporomandibular disorders. The research aim was to study the TMDs therapeutic possibilities and the biochemical impact of drug treatment at patients diagnosed with TMDs and cranio-mandibular malrelation and we applied various methods of treatment on study group, comprised 88 (18.92%) patients in single/or multiple therapy, addressed to patients diagnosed with TMDs and craniomandibular malrelation. We consider a relevant good answer from effectiveness treatment point of view results.

Keywords: public health dentistry, temporomandibular disorders (TMDs), analgesic drug therapy, stomatognathic system., functional and aesthetic prosthetic treatment.

The studies of this complex joint of the human body and the rich pathology that can develop suggested that imbalances at this level may have onset or clinical signs concentrated around the temporomandibular joint (TMJ). There by, in the cranio-mandibular malrelation, the TMJ can be affected primarily or may occur as a consequence of imbalance, especially at a functional level, with an important biochemical component, of the other components of the stomatognathic system.

Experimental part

Temporomandibular joint disorders (TMDs) and their treatment is a challenge both for the patient, but also for the dentist. In the beginning, the emphasis is to observe the signs and symptoms of the TMDs, in their description and research their share in the craniomandibular malrelation.

Material and method

Aim and objective

Pain reduction and improvement of the mouth opening are the main goals in the treatment of TMDs. So, the research aim was to study the TMDs therapeutic possibilities and the biochemical impact that the dentist can use, outlining as objective the drug treatment of TMDs and its effectiveness for verification.

The patient with its own pathology and therefore individualization of the treatment is the first motto of the physician in establishing the treatment plan for TMDs with craniomandibular malrelation. However, we can talk about a treatment plan tailored to each patient and situation but on the same data base characteristics.

This is a prospective study based on data obtained between 2016 and 2018, from the 465 patients in the Clinical Ambulatory of the St. Spiridon Hospital and Gnatoprosthetic Discipline of Dental Medicine Faculty, Iasi. Our final studied group comprised 88 (18.92%) patients diagnosed with TMDs and cranio-mandibular malrelation.

The inclusion criteria for the patients in our study were represented by the presence of TMDs and craniomandibular malrelation, clinical diagnosed and paraclinical distinguished based on CT or TMJ tomography, and also complementary and additional on T-scan analysis [1]. Also, subjects were included which presented signs and symptoms of TMDs and cranio-mandibular malrelation, such as: pain at the level of stomatognathic system and cephalic extremity, limitation of mouth opening, and deviation of mandible from the medial line during the opening and functional alteration of stomatognathic system.

The exclusion criteria of the patients were represented by the presence of joint affliction, of the third molar pathology, osteoarthritis, neoplasm [2, 3], bone injury at TMJ level [4, 5], patients who exhibited signs.

Research ethics requirements

When patients were willing to participate, they were requested to fill an informed consent.

Study protocol

We have been able to applied to the involved study patients the specific questionnaire on TMD. The *TMD Pain Screener* measures a patient's chronic TMJ pain intensity and other features. The pain evaluation are based on self-

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report, observational (behavioral) and physiological data [6].

Further, we applied various methods of treatment, in single/or multiple therapy, addressed to patients diagnosed with TMDs and craniomandibular malrelation; 92.05% (81 cases) from all studied patients had the diagnostic confirmed.

A comprehensive database was generated on the support of patient observation sheets which contained the results of clinical examination [7-9], laboratory exam, diagnoses, and treatment plans [9] during the study.

The database was created using Microsoft Excel 2010 for Windows and the data were analyzed with the SPSS statistical software package (version 18.2 for Windows; SPSS, Inc., Chicago, IL, USA) [10]. The SPSS descriptive statistics module was used, which allowed the calculation of the main indicators.

Statistical significance tests (Pearson χ^2 test) were applied in order to check the statistical significance of the noticed differences.

Results and discussions

The gender distribution is the first independent variable taken into consideration. Our study included 57 female patients (64.77%) and 31 male patients (35.23%), the gender ratio being F/M = 57/31 = 1.84/1.

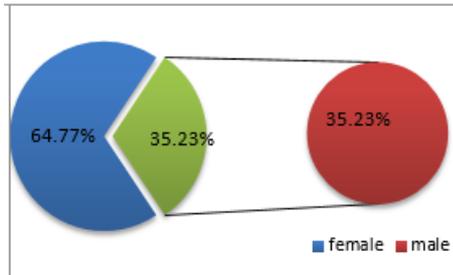


Fig. 1. Studied group- gender distribution

The patients are divided depending on the social environment. Thus, in our study there were 51 (57.95%) patients from the rural area and 37 (42.05%) from the urban area (fig. 2).

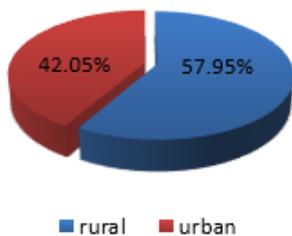


Fig. 2. Studied group- social environment distribution

We classified the patients included in the study on age groups (fig. 3): 20-29 years-9 patients; 30-39 years-14 patients; 40-49 years-39 patients, 50-59 years-11 patients and 60+ years -15 patients.

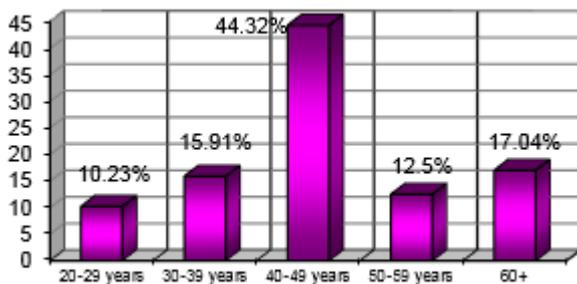


Fig. 3. Distribution on age groups

The prevalence of modification at TMJ level was 94.32% (83 cases).

The TMJ is equipped with numerous receptors located in the following areas: premeniscal, retromeniscal, capsula and ligaments. So, the symptoms of the TMJ area can be observed in patients with TMDs and craniomandibular malrelation diagnosis, regardless of its clinical forms. It is characterized by pain, the presence of joint noises, jumping joint, jaw deviation, subluxation, limiting mouth opening and joint lock. Such signs and symptoms may occur alone or coexist with each other or associated with signs of other elements of the stomatognathic system.

Therefore, an involvement of any type (tumor [3, 4], traumatic [5, 6], inflammatory, infectious [11] etc.) of the TMJ parts to excite the receptors will result in pain [12]. It can be unilateral, bilateral, at rest or moving, with variable intensity, localized, referenced or psychogenic. Joint pain treatment is performed in order to restore the physical comfort of the patient, as well as to ease pain at times of maximum intensity and to provide comfort for the patient during sleep and chewing. The prevalence of TMJ pain is found in the table 1.

Table 1
TEMPOROMANDIBULAR JOINT DISORDERS-PREVALENCE OF TMJ PAIN

Clinical sign:	Affected patients:	
	Number	Prevalence (%)
TMJ pain	79	89.77

There is an approximately equal distribution of right and left TMJ affectation and the prevalence of occurrence of pain symptoms may correlate with impaired external pterygoid muscle thereby forming the pterigomuscular complex. Even if pain is first or the beginning symptom in the TMJ, it quickly becomes musculoarticular, due to the TMJ protection mechanism consisting in the reflex contraction of the external pterygoid muscle. Also, the pain can also occur on the *chin* -compression maneuver, indicating indirectly the affectation of TMJ but from articular point of view.

Joint noises, as crackles, respectively crepitation, are in the first case the result of inconsistent activity of the menisco-ptyergoidal muscle complex and joint ligament laxity, that is typical and characteristic to *reductible* meniscal dislocations. If crepitation sound cause is the bone surfaces friction, together, are characteristic of *irreducible* meniscal dislocations. The prevalence of TMJ noises is 44.32% (39 cases).

Regarding the study research results of leap jaw joint is accompanied by latero -deviation in 19 cases (21.59%); the prevalence on gender is shown in the fig. 4., the limitation of mouth opening and joint blockage that were due to arthrolith, osteophytes, meniscus drop, and also muscle spasms. (hypercontraction on pterigoides muscle). Stomatognathic system integrity (elements are necessary but not sufficient) are particularly difficult to detect the exact cause of, muscle or joint, dynamic changes of the jaw.

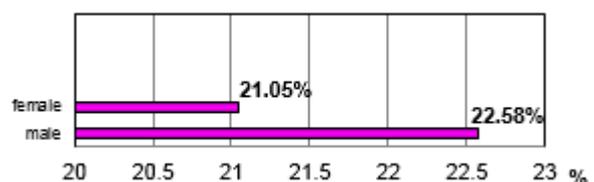


Fig. 4. Prevalence of leap jaw joint accompanied by latero-deviation- on gender

The TMJ dynamic exam emphasize, right and left laterodeviation and also, protrusion. So, the TMJ factor is most prominent in the clinical examination for the opening and closing movements of the mouth (fig. 5). Even if there is influence from the muscle, observing these movements remains a relevant examination.

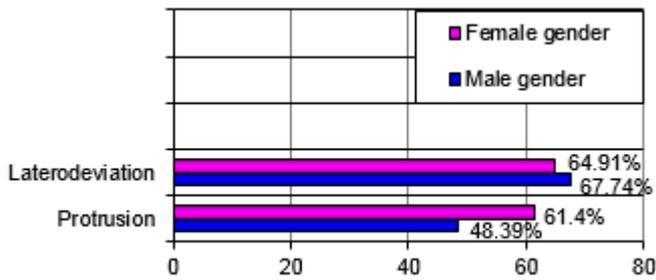


Fig. 5. The results of the TMJ dynamic exam (laterodeviation right and left and also protrusion)

Other signs and symptoms of TMDs is the deviation of the mandible in the opening movement of the mouth (13 cases) and subluxation (5 cases); the prevalence is shown in the figure 6.

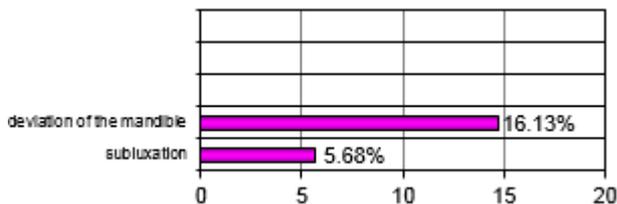


Fig. 6. Temporomandibular joint disorders- prevalence of mandible deviation in the opening movement of the mouth and subluxation

The results indicates the presence of morphological asymmetries and specially functional TMJ asymmetries, that can produce craniomandibular malrelations. The TMJ changes in the craniomandibular malrelations can be classified in the following major categories: impaired complex mandibular condylemeniscus; structural incompatibility between surfaces of their joint; TMJ inflammatory dysfunction.

Most of subjects in our study belong to the third category, namely modifications due to TMJ inflammatory disorders. So, TMDs of inflammatory origin is characterized by pain (exacerbated by any movement of the mandible) and disability.

There are favorising factors that can be mandatory for TMJ disorders from the ongoing study. We distinguish several categories including: sinovitis, capsulitis, retrodiscitis and arthritis, depending on the inflammation articular tissue. Sinovitis and capsulitis have the same clinical manifestations, the result of a direct trauma to the TMJ joint area, or an infection that has spread to the joint tissues.

Regarding the etiological treatment for the limitation of mandibular movements, we consider analgesics and antiinflammatories administration, physiotherapy procedures (moist heat or ice in case of an infection, ultrasound procedures), possibly one immediately posttraumatic infiltration with corticosteroids.

Retrodiscitis may be caused either extrinsic or intrinsic trauma. In the first case because of a direct or indirect hit to the mandibular condyle, retrodiscal tissue is damaged and therefore will inflame. The patient will complain of failing to chew on in the affected side, and the application of high forces will exacerbate the pain.

Indirect trauma in the case of meniscus dislocation, when the mandibular condyle, instead of staying on the

meniscus, stays on the posterior meniscal reins, will be in a elongate position. Retrodiscal tissue will not withstand the forces exerted by mandibular condyle and will respond with inflammation. Retrodiscal tissue edema may cause occlusion in the open side of the arch on the same side.

Retrodiscitis treatment is different depending on the cause, extrinsic or intrinsic. Thus in the case of retrodiscitis from a extrinsic cause analgesics should be administered, it is recommended to limit jaw movements seeking rest as much as possible for TMJ movements, soft diet, passive stretches, ultrasound therapy and thermotherapy. If acute malocclusion appears a muscle relaxation splint that should be adjusted progressively as the degree of inflammation lowers should be applied.

In the case of retrodiscitis from a intrinsic cause, treatment is to restore a relationship craniomandibular and correct TMJ trough the initial application of muscle relaxation splint, and if necessary a previous repositioning splint. Both will ease the pain immediately and be worn only at night. It is also recommended to limit TMJ movement, analgesics, thermotherapy with ultrasound therapy. In the case of chronic inflammation steroids infiltrations are not recommended.

Arthritis is the inflammation of the articular surfaces and may have different clinical forms: osteoarthritis and polyarthritis. Their treatment is carried out in collaboration with the rheumatologist, dentist being tasked with the development and implementation of interceptors muscle relaxation that will leave TMJ in a resting state, and where appropriate craniomandibular repositioning, provisional gnathoprosthetic prosthesis at first and then final.

The treatment of TMDs often entails the use of etiologic treatment and symptomatic treatment, results are faster and lasting. There are situations where surgery is the only solution to a particular TMJ situation, but unfortunately it is a general contraindication (body dragged) or intensity of clinical signs warrant surgery. Therefore, the only solution to improve TMDs is symptomatic therapy [13].

The range of treatments available to us is sufficiently wide and consists of: analgesics treatment for TMJ pain; antiinflammatory drug therapy; TMJ physiotherapy treatment. TMDs treatment in the studied patients group is shown in the figure 7.

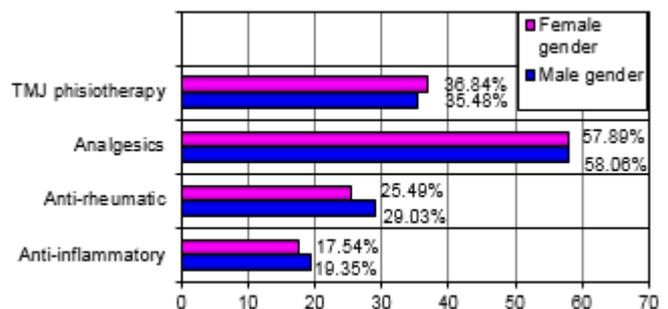


Fig. 7. Temporomandibular joint disorders treatment- on gender

Out of the group of patients experienced TMJ pain, unilateral or bilateral; the difference between the prevalence of pain symptoms (89.77%) and the prevalence of prescribed medication (57.95%) results from the fact that the intensity of TMJ pain (discomfort) did not involve the administration of analgesics.

Analgesics administration (acetyl salicylic acid, ibuprofen, indomethacin, phenylbutazone), relieve pain and provide appropriate patient calm. The most common is to use acetyl salicylic acid, as reasons on the one hand

analgesic effect on the other hand the antiinflammatory. Doses that were prescribed were 1 to 3 tablets /day, using 500 mg tablets.

Antiinflammatories that reduce local symptoms at the TMJ and improve its functionality are also useful, usually associated with antiinflammatory treatment for the faster results.

In cases with both, rheumatic and etiology dysfunctionality [15], indomethacin and phenylbutazone are indicated due to their analgesic and also antirheumatic effects. Medication with antirheumatic effect is applied in conjunction with the rheumatologist [16].

Articular analgesia can be achieved also by infiltration with Boicil forte or lidocaine 2%, represents an original Romanian contribution. Also, this implies the infiltration with corticosteroids (hydrocortisone, prednisone, triamcinolone), positive results occurring in about one week. Both intra- and extraarticular infiltrations are effective. We performed infiltrations with hydrocortisone on 1.13% of patients in the studied group, a single infiltration typically preceded by the local anesthetic. Prudence, permanently accompanied the indication of intra-articular infiltration, only in the cases with obvious signs (CT, MRI) arthritic [14], since infections occur quickly in the joint and the procedure is painful.

The decrease in the viscosity of synovial fluid can be obtained by intraarticular infiltration of hyaluronidase [15], and the reduction of the ligament laxity resulting from infiltration of sclerosing substances. The technique is dangerous and therefore we did not execute it, preferring patient awareness and education about the range of movement of mouth opening.

Efficacy of treatment [16, 17] regimens considering the TMDs was demonstrated through the small prevalence (10.23%) of recidivism for signs and symptoms of craniomandibular malrelations in the studied group.

Conclusions

The TMJ is one of the most complex in the human body, touching it disrupts optimal functionality stomatognathic system, resulting imbalances and to other system elements, triggering craniomandibular malrelations.

There are many patients with articular changes that do not complain about malrelations symptoms. They are certainly in a preclinical phase of craniomandibular malrelations, having an increased compensation power of the stomatognathic system. They have permanent dispensary, to detect the symptoms indicating the recidivism of the disease.

The treatment of TMDs, in general and especially for craniomandibular repositioning, requires a dentist with special training, and the interdisciplinary collaboration with a rheumatologist and an OMF surgeon. The high prevalence of modification at TMJ level implies a necessity for continuous training of experts on this field.

The treatment cannot be unilateral, but it must be associated with the need to rebalance the other elements of the stomatognathic system, the result sought is actually rehabilitation of all fundamental parts of the craniomandibular relations both static and dynamic.

Treatment of TMDs is always bound to change complicated settings and TMJ pathology that shows a patient with craniomandibular malrelations.

Proposed treatment plan is relatively simple, but requires a careful differential diagnosis so it is adequate to TMDs.

Effective of functional, aesthetic, prosthetic treatment in this study case was a good relevancy and was demonstrated through the small prevalence (10.23%) of recidivism for signs and symptoms of craniomandibular malrelations in the studied group.

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